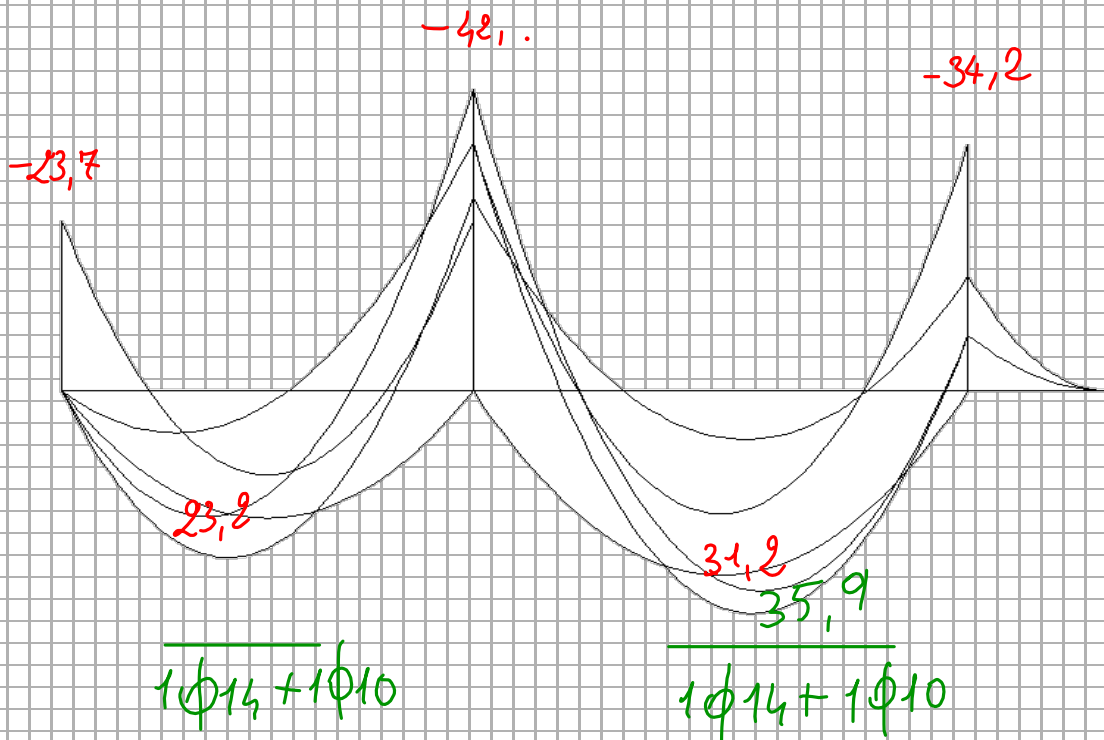


PROGETTO ARMATURE SOLAIO: BARRE SAGONATE



Com.	$M_{ed} (kNm)$	$d (cm)$	$A_s (cm^2)$	travetto	barre
1	23,2	22	2,99	1,50	1φ14 + 1φ10
2	31,2	22	4,03	2,01	1φ14 + 1φ10

$$A_s = \frac{M_{ed}}{0,9 d f_{yd}} \quad 2 \text{ travetti}$$

$$h = 25 \text{ cm} \quad c = 3 \text{ cm} \quad M_{Rd} = 0,9 d A_s f_{yd} = 0,9 \times 0,22 \times \times 2,32 \times 2 \times 391,3 \times \frac{10^3}{10^3} = 35,9 \text{ kNm}$$

App.	M_{Ed}	d
1	23,7	21
2	42,1	21
3	34,2	17

h

$$c = \underbrace{2,5}_{\gamma_{min}} + \frac{\phi_1}{2,1} + \phi_2 = 2,5 + 0,5 + 0,8 \approx 4 \text{ cm}$$

App.	M_{Ed}	d	$A_s (\text{cm}^2)$
1	23,7	21	3,20
2	42,1	21	5,7
3	34,2	17	5,7

$$A_s = \frac{M_{Ed}}{0,9 d f_{yd}}$$

App.	Med	d	$A_s (cm^2)$	fronto.
1	23,7	21	3,20	1,60
2	42,1	21	5,7	2,9
3	34,2	17	5,7	2,9

App. 2

sego metri
aggiunto

$$2 \phi 10 \quad A_s = 1,56 \text{ cm}^2$$

$$1 \phi 14 \quad A_s = 1,54 \text{ cm}^2$$

$$3,00 \text{ cm}^2$$

App.	Med	d	$A_s (cm^2)$	fronto.	barra
1	23,7	21	3,20	1,60	$2 \phi 10$
2	42,1	21	5,7	2,9	$1 \phi 14 + 2 \phi 10$
3	34,2	17	5,7	2,9	$1 \phi 14 + 2 \phi 10$

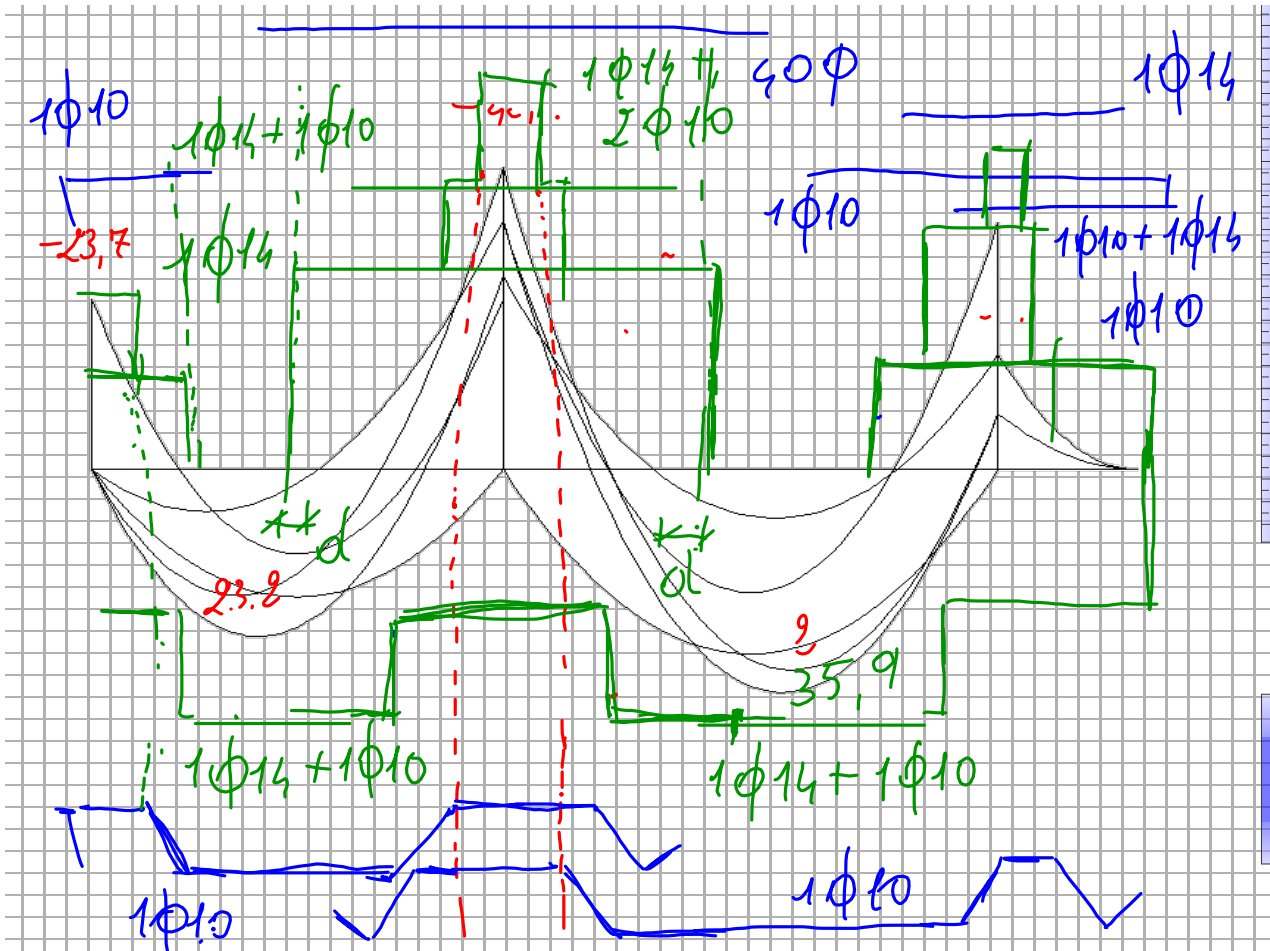
App. 1

sego metro
aggiunto

$$1 \phi 10 \quad A_s = 0,78 \text{ cm}^2$$

$$1 \phi 10 \quad A_s = 0,78 \text{ cm}^2$$

$$1,56 \text{ cm}^2$$



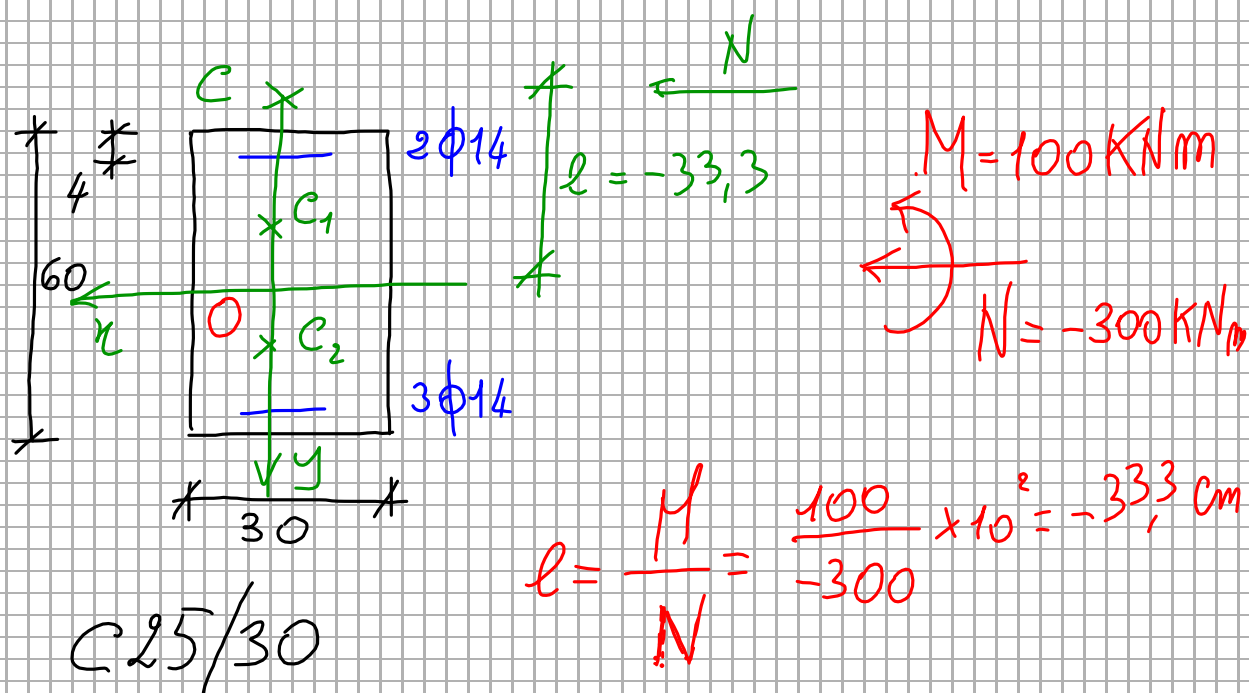
$$M_{rd} = \alpha \alpha d A_s f_{yd} = 0,9 \times 0,21 \times 1,54 \times 2 \times \frac{391,3}{10} = 22,8 \text{ KNm}$$

4φ14

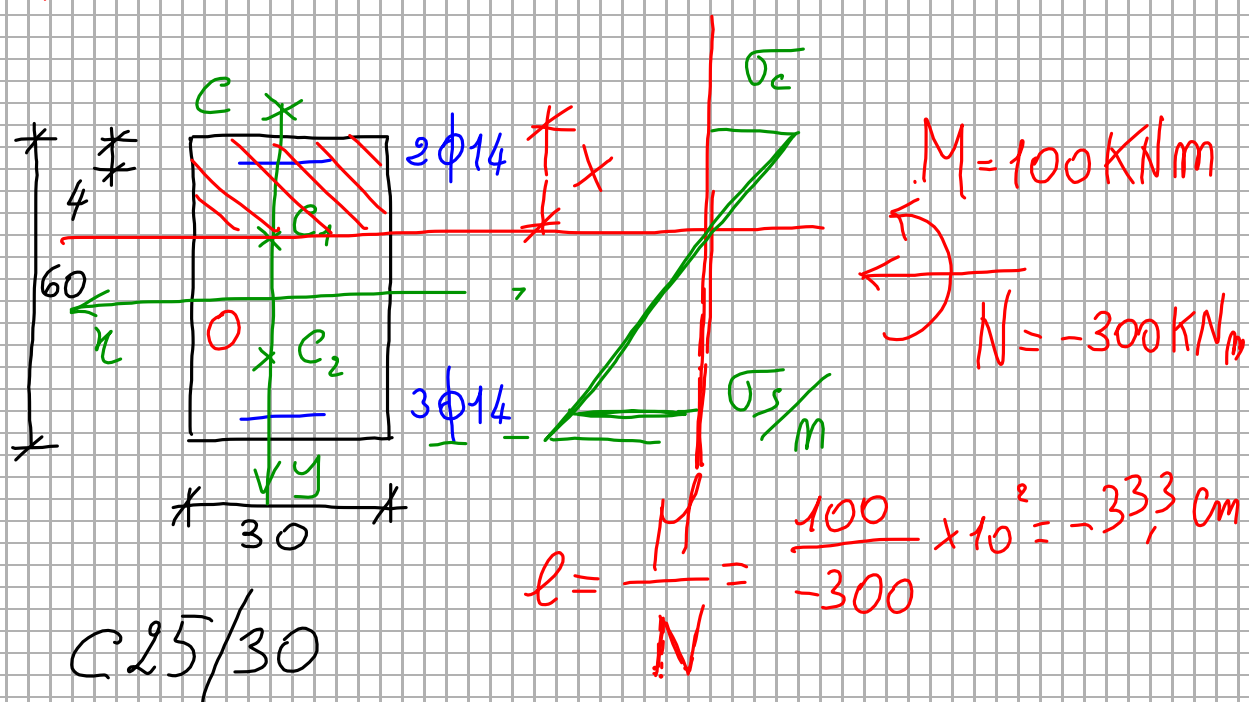
$$M_{rd} = 0,9 \times 0,21 \times 0,78 \times 2 \times \frac{391,3}{10} = 11,5 \text{ KNm}$$

1φ10

VERIFICA A FLESSIONE COMPOSTA II STADIO GRANDE ECCENTRICITA'



VERIFICA A FLESSIONE COMPOSTA II STADIO GRANDE ECCENTRICITA'



$$\begin{aligned}
 & X^3 - \underbrace{3d_c}_{B} X^2 + \underbrace{\frac{6m}{b} [A'_s(e-d_c) + A_s(d-d_c)]}_e X + \\
 & \underbrace{-\frac{6m}{b} [A'_s e(e-d_c) + A_s d(d-d_c)]}_D = 0
 \end{aligned}$$

$$d_c = \frac{h}{2} + \frac{M}{N} - \frac{60}{2} = 33,3 = -3,3 \text{ cm}$$

$$B = -3 \times (-3,3) = 9,9 \text{ cm}$$

$$\begin{aligned}
 & X^3 - \underbrace{3d_c}_{B} X^2 + \underbrace{\frac{6m}{b} [A'_s(e-d_c) + A_s(d-d_c)]}_e X + \\
 & \underbrace{-\frac{6m}{b} [A'_s e(e-d_c) + A_s d(d-d_c)]}_D = 0
 \end{aligned}$$

$$e = \frac{6 \times 15}{30} \times \left[3,08 \times (4 + 3,3) + 4,62 \times (56 + 3,3) \right]$$

$$= 889,35 \text{ cm}^2$$

Risolvo l'equazione

$$X = 25,7 \text{ cm}$$

$$\sigma = -\frac{N}{S_m} X = -\frac{300}{-8810,1} (-25,7) \times \frac{10^3}{10^2} = -8,75 \text{ MPa}$$

$$|\sigma| = 8,75 \text{ MPa} < 0,6 f_{ck} = 15 \text{ MPa}$$

OK!

Risolvo l'equazione

$$X = 25,7 \text{ cm}$$

$$\sigma_s = m \frac{N}{S_m} (d - X) = 15 \times \frac{-300}{-8810,1} \times (56 - 25,7) \times 10$$

$$= 154,7 \text{ MPa} < 0,8 f_{yk} = 360 \text{ MPa}$$

OK!

DOMINI M-N: IL STADIO

